

**FIRE AND EMS
STAFFING AND OPERATIONS STUDY**

CITY COUNCIL BRIEFING

CITY OF FORT WORTH, TEXAS

August 25, 2022

Overview of Today's Presentation

1. Scope of Work for the Citygate Fire and EMS Study
2. Top Five Fire and EMS service delivery challenges
3. Risks to Be Protected and Outcome Goals
4. Service Demand
5. Response Time Performance
6. Fire Headquarters Staffing
7. Recap of Findings, Recommendations, Priorities, and Next Steps

Important Terminology for this Presentation

- **ALS** – Advanced Life Support (Paramedic)
- **BLS** – Basic Life Support (EMT)
- **Fractile** – Percent of goal measure – 90%
- **TCFP** – Texas Commission on Fire Protection
- **NFPA** – National Fire Protection Association
- **Call Processing** – Time used by dispatcher from answer to crew alert
- **Crew Turnout** – Time from alert to wheels rolling, including firefighters donning the required safety clothing
- **First-Due Travel** – Driving time for the first responder
- **First-Unit Call to Arrival** – Time from 9-1-1 answer to first responder at the address
- **First Alarm Call to Arrival** – Time from 9-1-1 answer to the last needed unit to arrive

Citygate and the City's Scope of Work

- The City's scope was a a Fire and EMS Staffing and Operations Study of its Fire Department
- The study was to include a comprehensive review of the effectiveness and efficiency of all Department services provided
- Also, to review the interaction with MedStar's services
- Citygate is a 30-year-old firm of experienced public agency executives committed to serving public agencies
- Our subject matter specialists have performed over 400 fire service studies over the last 20 years; we have served over 26 million residents

How the Work Was Conducted

- Over 1.8 gigabytes of data and documentation reviewed
- Internal and external stakeholder interviews
- Comprehensive community risk assessment
- Incident data statistical analysis
 - Service demand and response performance
- GIS travel time analysis
 - 32 maps
- Headquarters support staffing and organizational assessment
- Multiple progress briefings
- 411-page Final Report evaluating deployment and headquarters

Council Policy Choices

- There are **no federal or state laws or regulations** in the U.S. mandating fire service staffing levels, response performance, or outcomes
 - If fire services are provided, state and federal safety regulations apply
- **The level of fire service** provided is a **local policy decision**
 - Communities have the level of service they can afford or which they choose to fund
 - This may not be the **desired** level of service

Overall Positives

- *Very* committed staff in every agency
- Centered on training and employee health
- Skills technically competent
- *Excellent* safety programs
- Staffs want to grow and improve
- Complete candor and data transparency

Five Service Delivery Challenges

- **Growth in the north City and along almost all other edge areas** for effective fire station response times
- **First paramedic delivery** given MedStar's paramedic ambulance response times
- **Lengthy dispatch processing times** given the interplay of three dispatch centers
- The **need for specific, outcome-driven service goals** adopted by the City Council to drive investment, improvements, and accountability
- Fire headquarters **staffing** and **budgeting for overtime** going forward

Risks to Be Protected and Outcome Goals

Fire/EMS Outcome Goals

- Fire service deployment delivers desired **outcomes**
- Typical desired outcomes in urban communities:
 1. Prevent permanent impairment from medical emergencies where possible
 2. Confine building fires to the room or compartment of origin
- Delivering outcomes depends on adequate staffing, apparatus types, and response times to differing emergency events

Deployment Strategies

- Fire service deployment is essentially about the **speed** and **weight of response**
 - *Speed* refers to the **single neighborhood-based first responders** to mitigate routine-to-moderate emergencies for the outcome desired
 - *Weight* refers to the **multiple-unit response** (First Alarm) needed to control serious emergencies for the outcome desired
- Specialty units are utilized in addition to (or in lieu of) engines and ladder trucks

Risk Assessment Methodology

- Establish geographic **planning sub-zones**
- Identify/quantify **values at risk** to be protected
- Identify **hazards** likely to impact City
- Determine **probability** of a hazard occurrence
- Identify probable **consequence severity** of a hazard occurrence
- Identify **impact severity** of a hazard occurrence on Department response capacity
- Quantify **overall risk** by hazard sub-type

Values at Risk

- **People**

- Population: **930,702** (2021)

- Resident population growth: **31%** by 2045

- **> 350,000** residential housing units

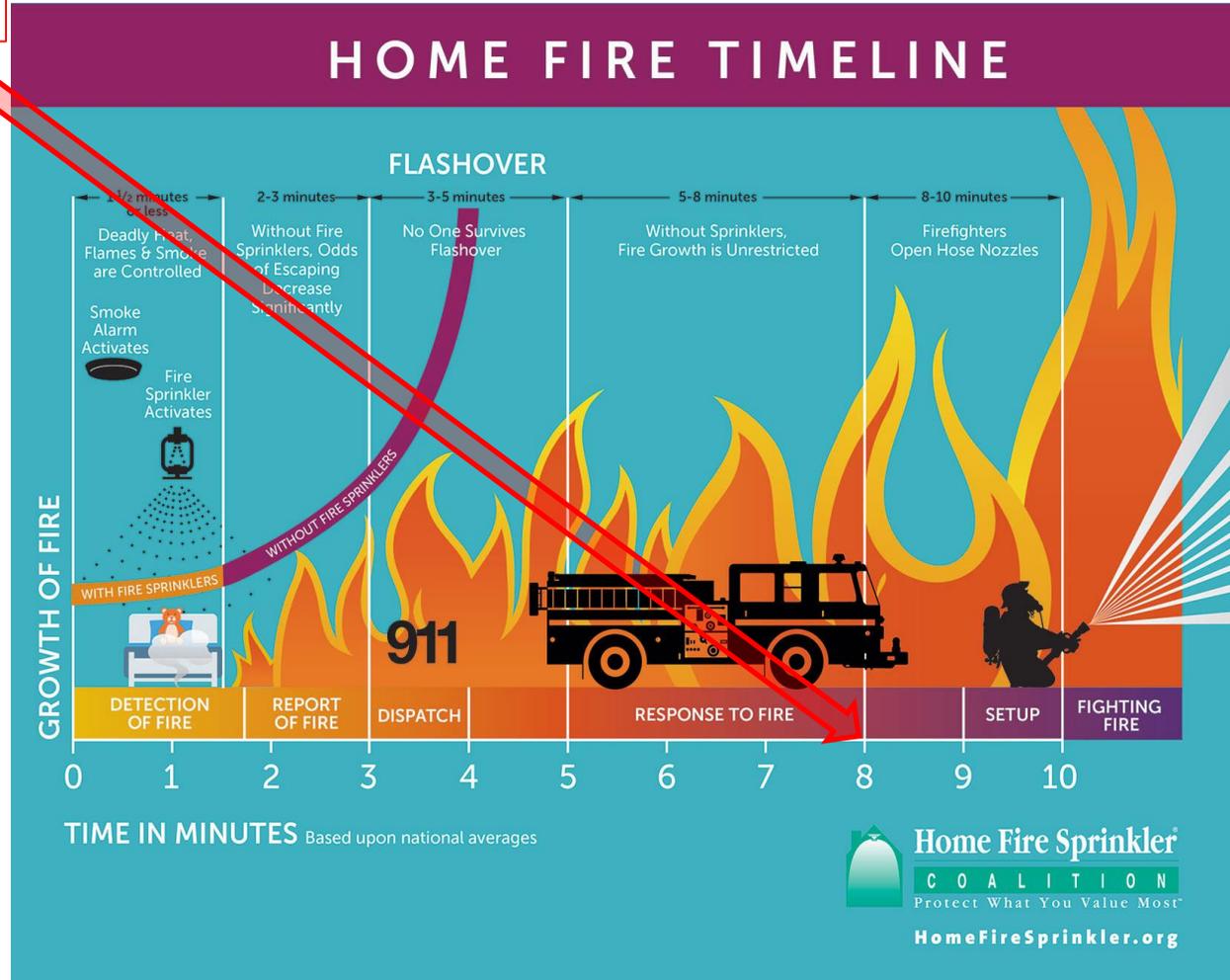
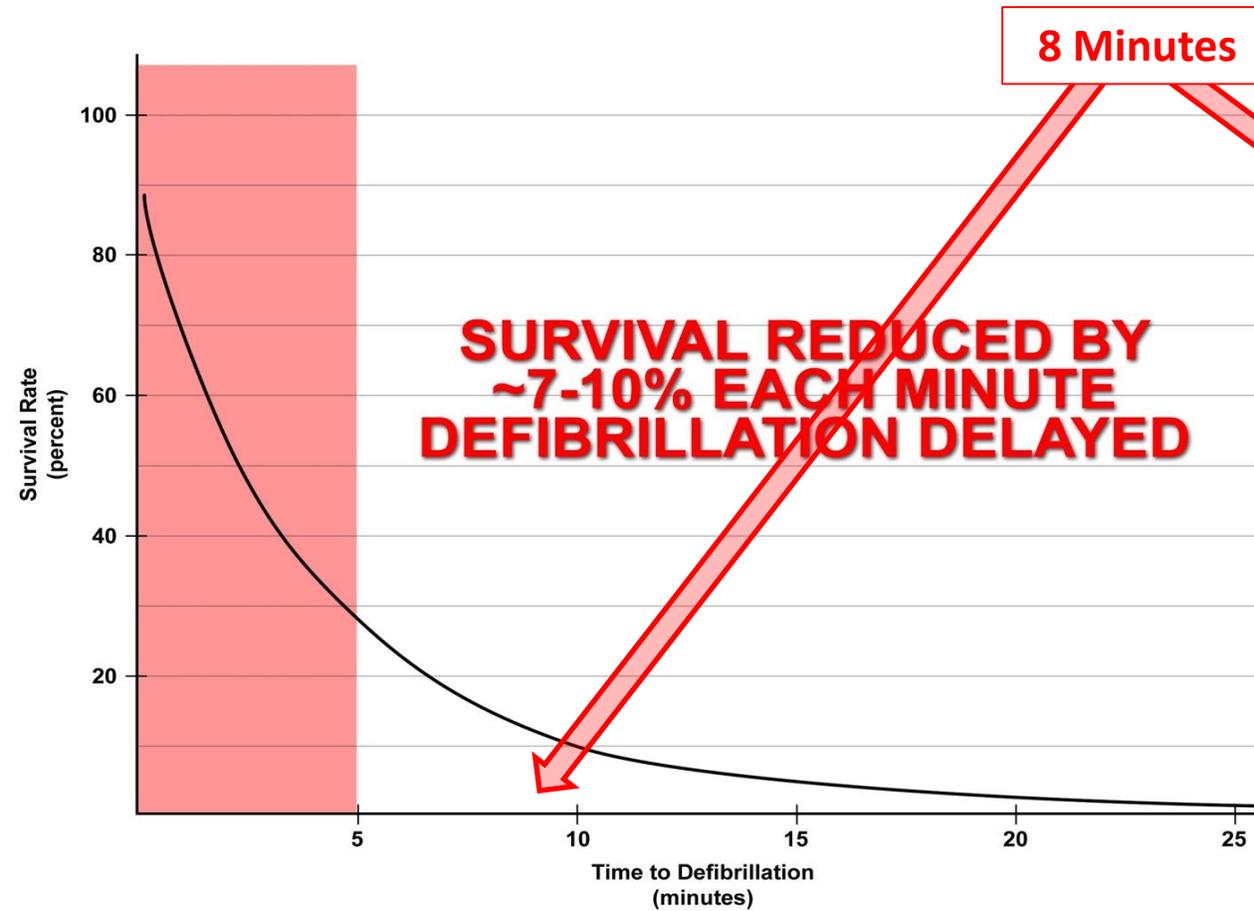
- **275** critical facilities

- **1,193** high/maximum-risk occupancies

Values at Risk (cont.)

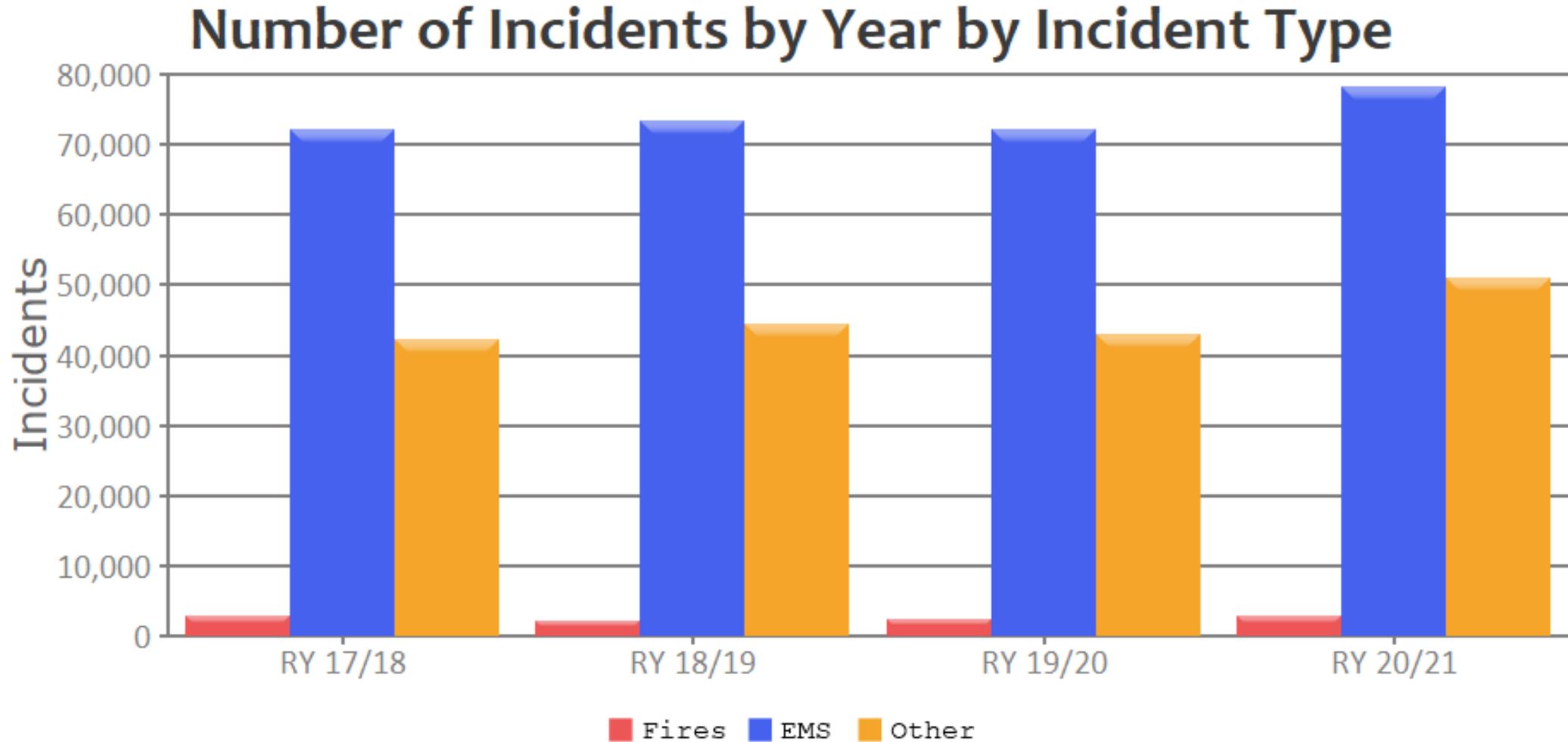
- **Economic Resources**
 - > **27,500** businesses (2021)
 - > **391,500** employees (2021)
 - **Diverse, robust economy** led by:
 - Aerospace/Aviation
 - Defense/Security
 - Energy
 - Financial Services
 - Food Processing
 - Information Technology
 - Life Sciences
 - Manufacturing
 - Transportation/Logistics
- Numerous **cultural, historic, and natural resources**

Emergency Timeline Targets

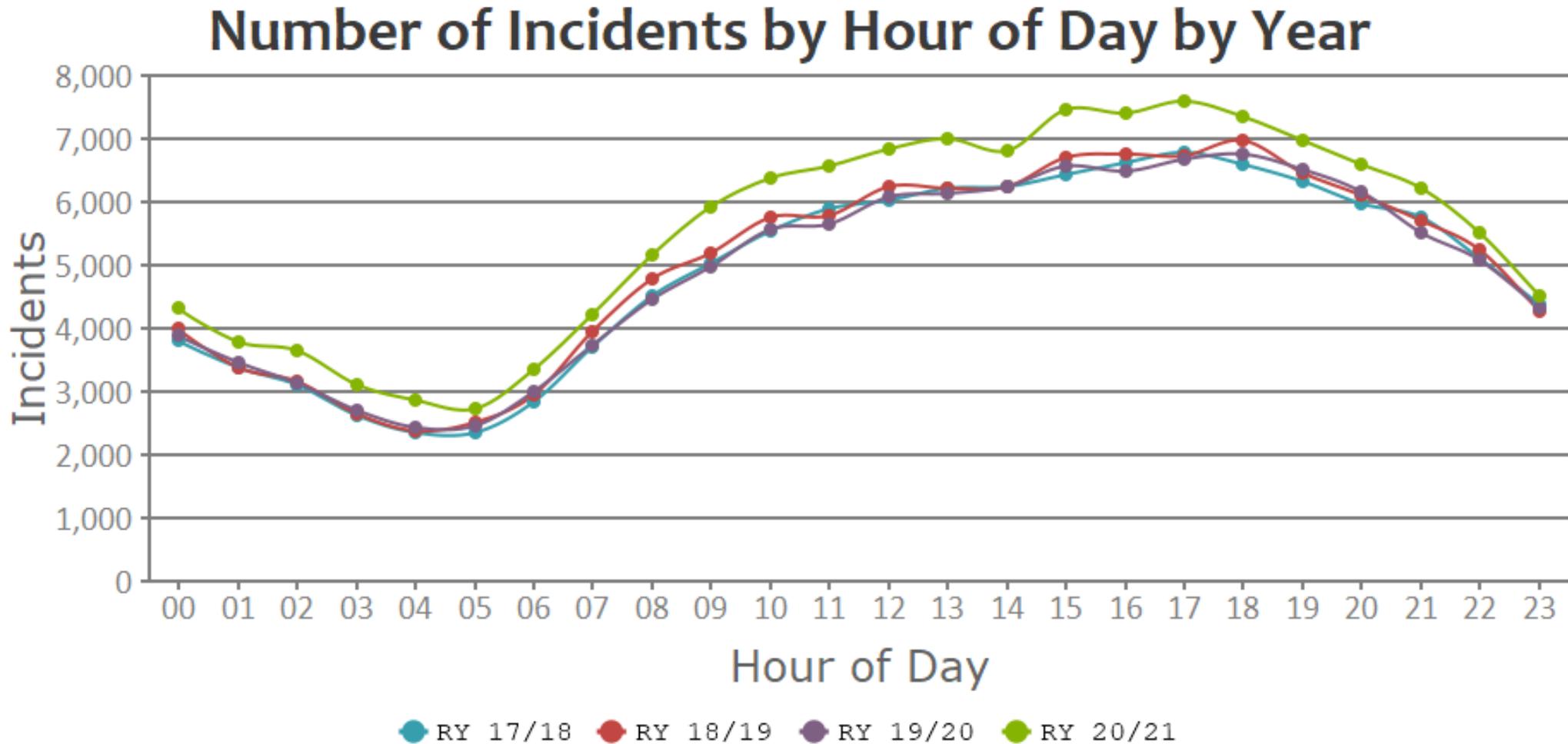


Service Demand

Service Demand by Incident Type



Service Demand by Time of Day



Unit-Hour Utilization – 10 Busiest Engines (20/21)

Percentage of each hour across 52 weeks that there are active incidents open

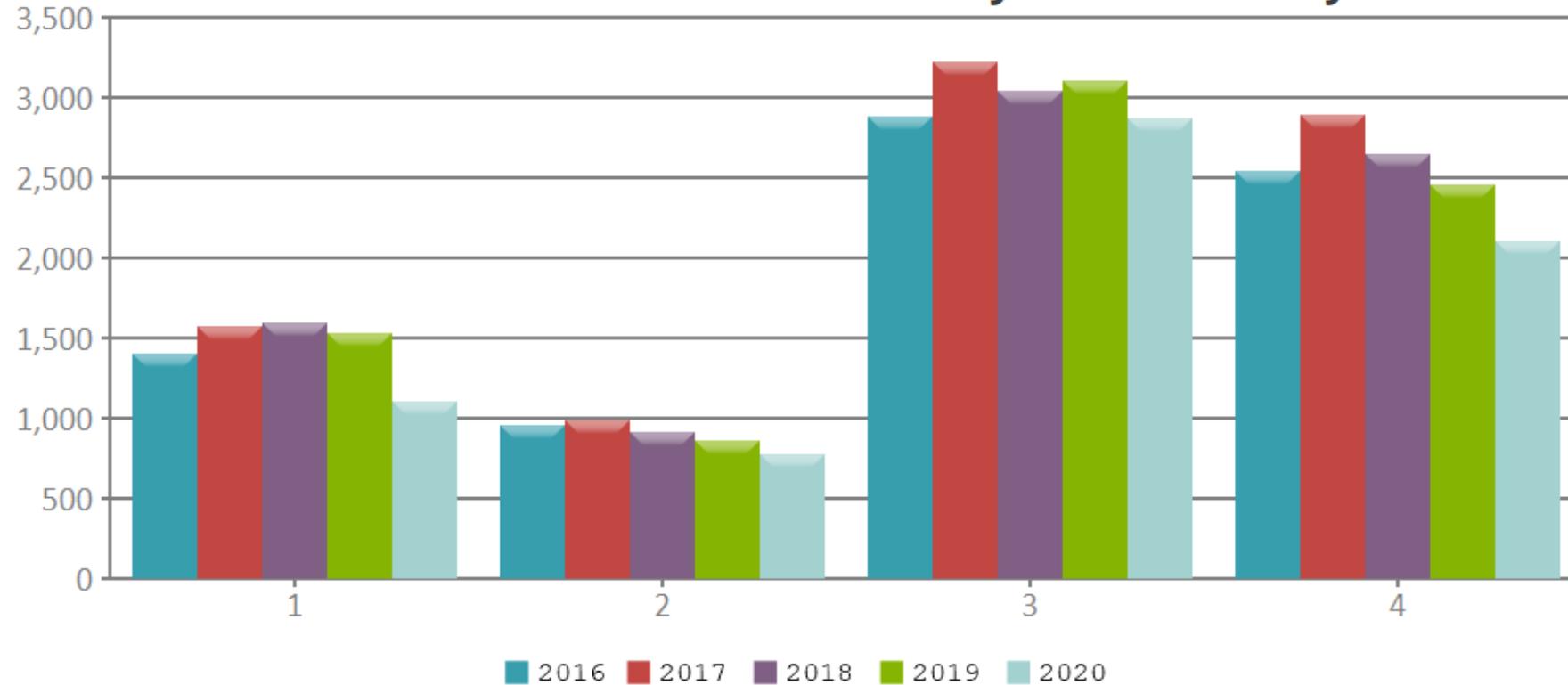
Above a saturation of 30% hour after hour, crews cannot get to other duties

No units are close, and will not be if low-acuity EMS demand is controlled

Vehicle	E29	E31	E26	E22	E24	E23	E16	E17	E37	E07
00:00	14.65%	11.74%	11.47%	15.81%	14.52%	17.57%	12.08%	15.21%	10.67%	10.98%
01:00	12.05%	13.20%	10.40%	11.20%	13.26%	11.90%	10.25%	15.85%	10.43%	11.20%
02:00	12.07%	11.93%	9.52%	10.82%	12.83%	13.67%	10.16%	14.14%	10.20%	9.81%
03:00	9.83%	10.57%	8.94%	12.46%	10.59%	11.72%	10.35%	9.01%	9.52%	9.26%
04:00	10.45%	8.48%	9.80%	8.51%	5.55%	4.05%	8.65%	5.63%	7.50%	10.51%
05:00	8.98%	10.68%	9.99%	11.17%	7.14%	4.00%	7.48%	6.14%	6.82%	9.31%
06:00	11.17%	11.51%	9.76%	12.23%	7.18%	3.61%	10.07%	6.68%	9.46%	11.41%
07:00	13.85%	14.48%	14.79%	12.74%	12.21%	12.91%	12.28%	12.51%	12.73%	12.07%
08:00	15.02%	12.97%	16.40%	14.94%	13.96%	14.45%	16.16%	14.33%	13.89%	13.69%
09:00	16.33%	14.69%	18.68%	13.37%	19.16%	14.94%	15.59%	16.27%	13.74%	13.96%
10:00	17.70%	16.00%	18.82%	18.29%	18.43%	14.63%	17.47%	16.89%	15.29%	15.16%
11:00	18.08%	19.92%	21.28%	18.12%	17.92%	15.70%	18.66%	20.08%	17.22%	14.48%
12:00	20.71%	18.75%	19.65%	18.59%	20.21%	17.28%	18.83%	17.58%	14.76%	16.29%
13:00	23.66%	18.76%	22.29%	16.84%	18.26%	18.64%	17.08%	15.59%	22.09%	16.73%
14:00	17.68%	22.60%	24.75%	16.22%	19.61%	17.60%	19.81%	17.01%	18.73%	17.92%
15:00	23.51%	22.85%	22.89%	20.97%	25.97%	21.59%	19.85%	21.52%	21.46%	18.95%
16:00	23.91%	22.22%	22.63%	23.48%	20.87%	21.27%	20.40%	18.91%	21.91%	20.19%
17:00	21.74%	22.93%	23.21%	21.78%	22.44%	25.96%	22.18%	20.44%	27.06%	21.12%
18:00	22.74%	22.72%	21.22%	23.56%	21.52%	20.85%	20.24%	19.89%	21.06%	19.70%
19:00	21.35%	22.35%	20.06%	21.52%	19.63%	21.58%	18.89%	18.14%	19.25%	19.86%
20:00	21.56%	20.51%	20.33%	21.53%	20.84%	23.47%	17.63%	18.42%	17.54%	18.27%
21:00	18.31%	20.58%	17.53%	17.74%	18.00%	22.52%	17.70%	18.61%	16.64%	17.54%
22:00	17.60%	17.97%	16.74%	17.29%	15.66%	16.38%	16.23%	15.89%	15.76%	17.23%
23:00	14.53%	13.25%	10.06%	13.83%	14.21%	16.93%	13.24%	11.67%	11.06%	12.01%

Simultaneous Incident Activity

Station Simultaneous Incidents by Battalion by Year



One or more simultaneous incidents: **93.2 %**
Five or more simultaneous incidents: **56.8 %** (= to First Alarm)
Ten or more simultaneous incidents: **9.8 %**

Response Time Performance

Urban Response Time Best Practices – Positive Outcomes

Response Component	Best Practice	
	Time	Reference
Call Processing / Dispatch	1:30	NFPA
Crew Turnout	2:00	Citygate
First-Due Travel	4:00	NFPA / Citygate
First-Unit Call to Arrival	7:30	Citygate
First Alarm Travel – Class A	8:00	NFPA / Citygate
First Alarm Call to Arrival – Class A	11:30	Citygate

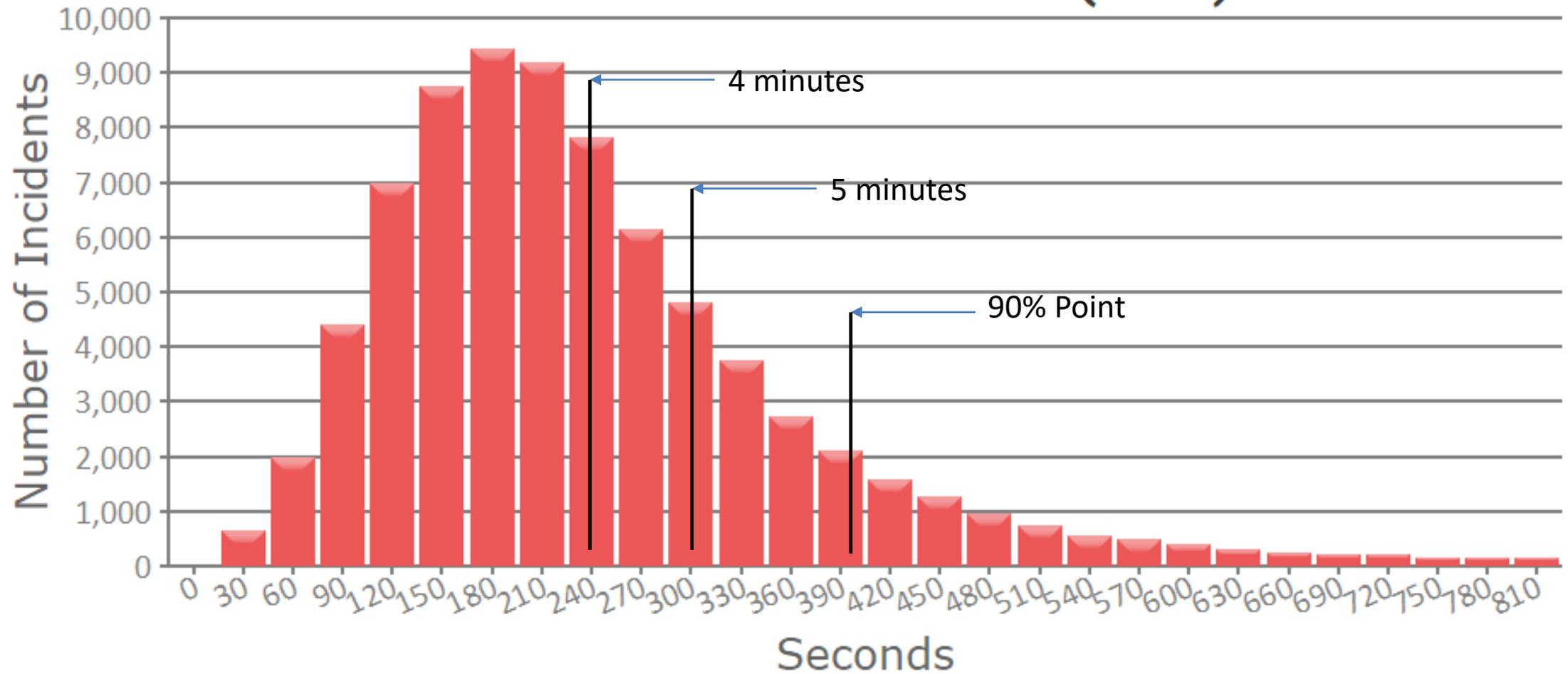
Fire Call-to-Arrival Time – 90% to Fire/EMS Calls – 20/21

Response Component	Best Practice		20/21 90 th Percentile Performance	Performance versus Best Practice
	Time	Reference		
Call Processing / Dispatch	1:30	NFPA	1:32*	+ 0:02
Crew Turnout	2:00	Citygate	3:01	+ 1:01
First-Due Travel	4:00	NFPA / Citygate	6:33	+ 2:33
First-Unit Call to Arrival	7:30	Citygate	10:21* (6:24 goal)	+ 2:51
First Alarm Travel – Class A	8:00	NFPA / Citygate	18:41	+ 10:41
First Alarm Call to Arrival – Class A	11:30	Citygate	21:51*	+ 10:21

* FD only, does not include Police 9-1-1 and MedStar

Fire First-Unit Travel Time – *Past Goal Point*

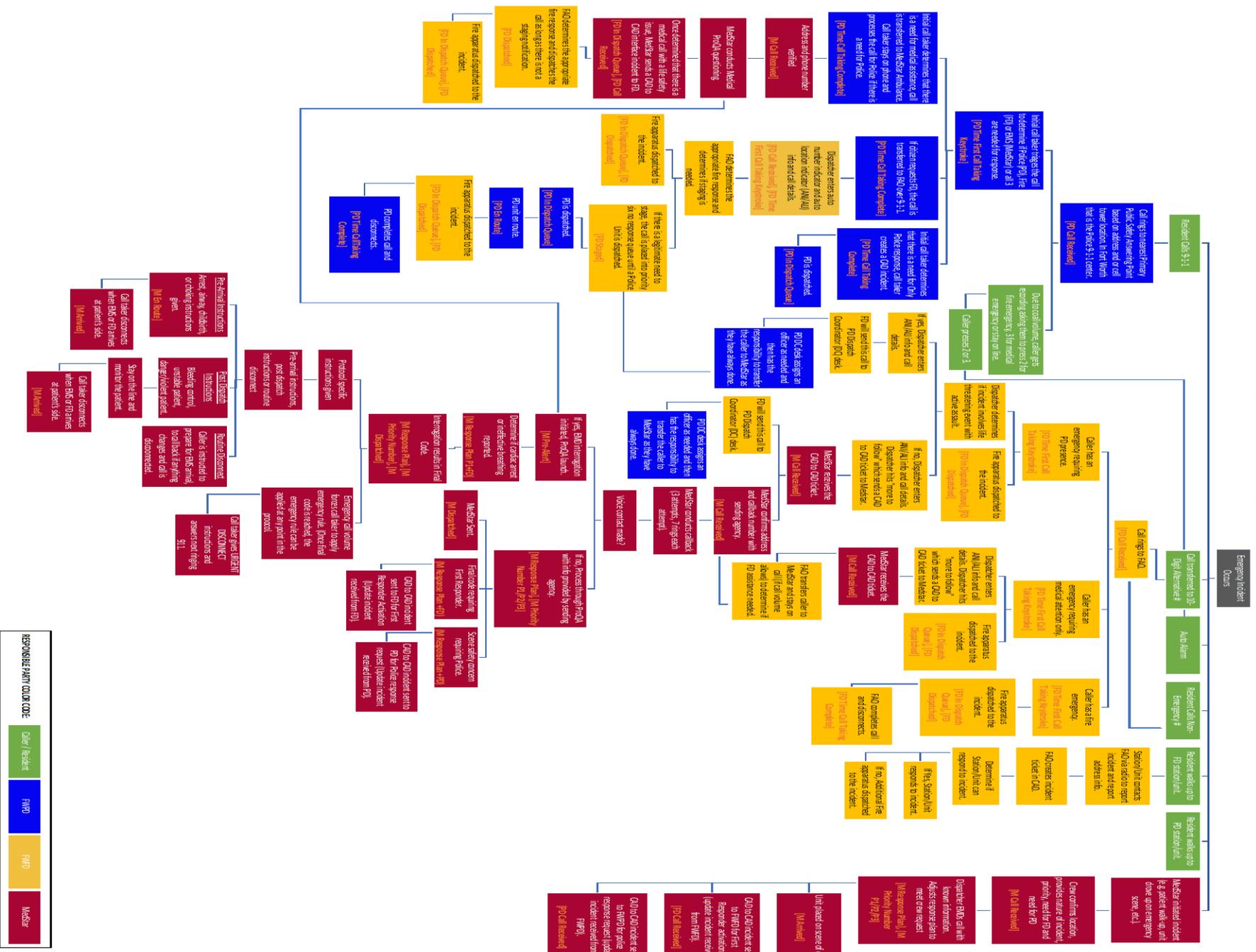
Fractile for Incidents Travel (CAD)



Dispatch Time by Center 17/18 – 20/21

Center	3-Year 90% Performance	Low	High	Best Practice or Citygate Goal
Police —All Transferred Incidents	2:42	1:33	3:26	0:30
MedStar —Priority 1 Urgent <i>Completed Incidents</i>	2:13	1:23	2:31	1:30
Fire —All Fire and EMS incidents, Not “Other”	1:32	1:13	1:47	1:30
90% Total (<i>if all three dispatch centers had to transfer and dispatch based on the Low or High</i>)	-	3:58	6:17	2:00

Emergency Call Flow Chart (Updated 3/1/22)



RESPONSE TEAM CODE	Color
Chief/Rescue	Green
FMP	Blue
FPD	Yellow
Medics	Red

MedStar Deployment Resources Plan

- **ALS Ambulances** – Staffed with one advanced paramedic and an EMT; they respond to 9-1-1 or *interfacility transfer calls*
- **BLS Ambulances** – Staffed by two basic EMTs
- **Critical Care Paramedic** – Typically, two to three single units
- **ALS Supervisors** – Two single-person units 24/7/365
- **Mobile Integrated Health Paramedics/EMTs** – Four units
- **Quick Response Vehicles** – One to two quick response units

MedStar Response Time by Priority

- Priority 1: **11** minutes
- Priority 2: **13** minutes
- Priority 3: **17** minutes
- Priority 4: **60** minutes

All times
at **85%**
compliance

Actual Per MedStar:

- Performance ranged from 73.2% – 84.2% in 2021
- Average time of 8:07 – 9:29

In Citygate's experience in multiple states, for critical (Priority 1) patient care in urban areas, the time for paramedic deployment ranges from 8:00–12:00 minutes at 90% for *call to arrival* of a fire station paramedic or an ambulance system paramedic. Many urban systems strive for 10:00 minutes or less for the arrival of the first paramedic.

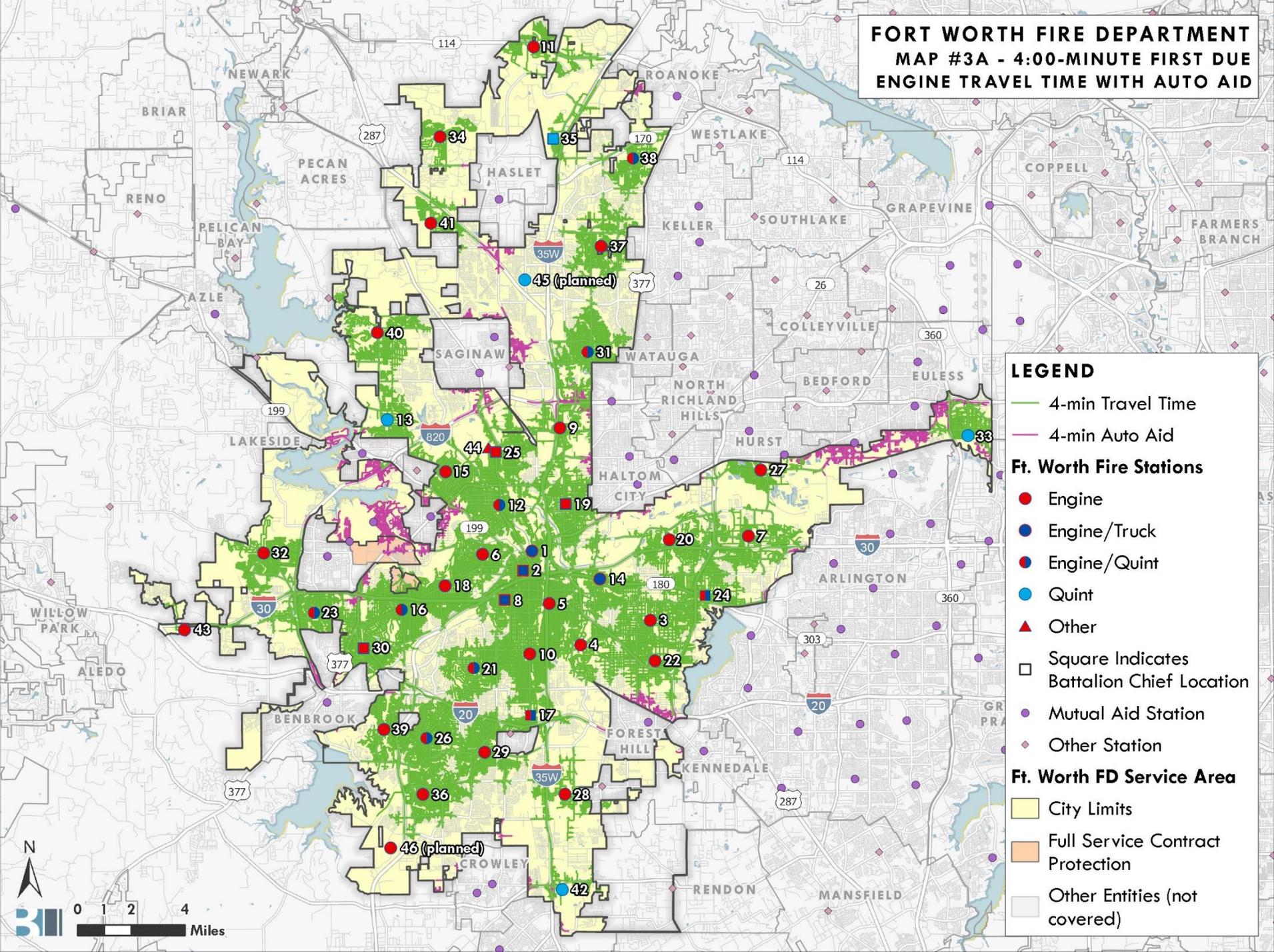
MedStar Priority 1 – 90% Response Time Fort Worth

Measure	RY 18/19	RY 19/20	RY 20/21
Dispatch – Without Police	1:23	2:22	2:31
Crew Turnout	0:23	0:25	0:22
Travel time	10:20	10:18	11:11
Call to Arrival	12:22	13:01	14:16

- Four years of Citygate data found an 11-minute compliance of **78.6%**
- The four-year count for Priority 1 at 11 minutes was 103,027
- Of those, 81,119 “pass” and **21,908 “fail”** for a failure rate of 18 per day

GIS Analysis

**FORT WORTH FIRE DEPARTMENT
MAP #3A - 4:00-MINUTE FIRST DUE
ENGINE TRAVEL TIME WITH AUTO AID**



LEGEND

- 4-min Travel Time
- 4-min Auto Aid

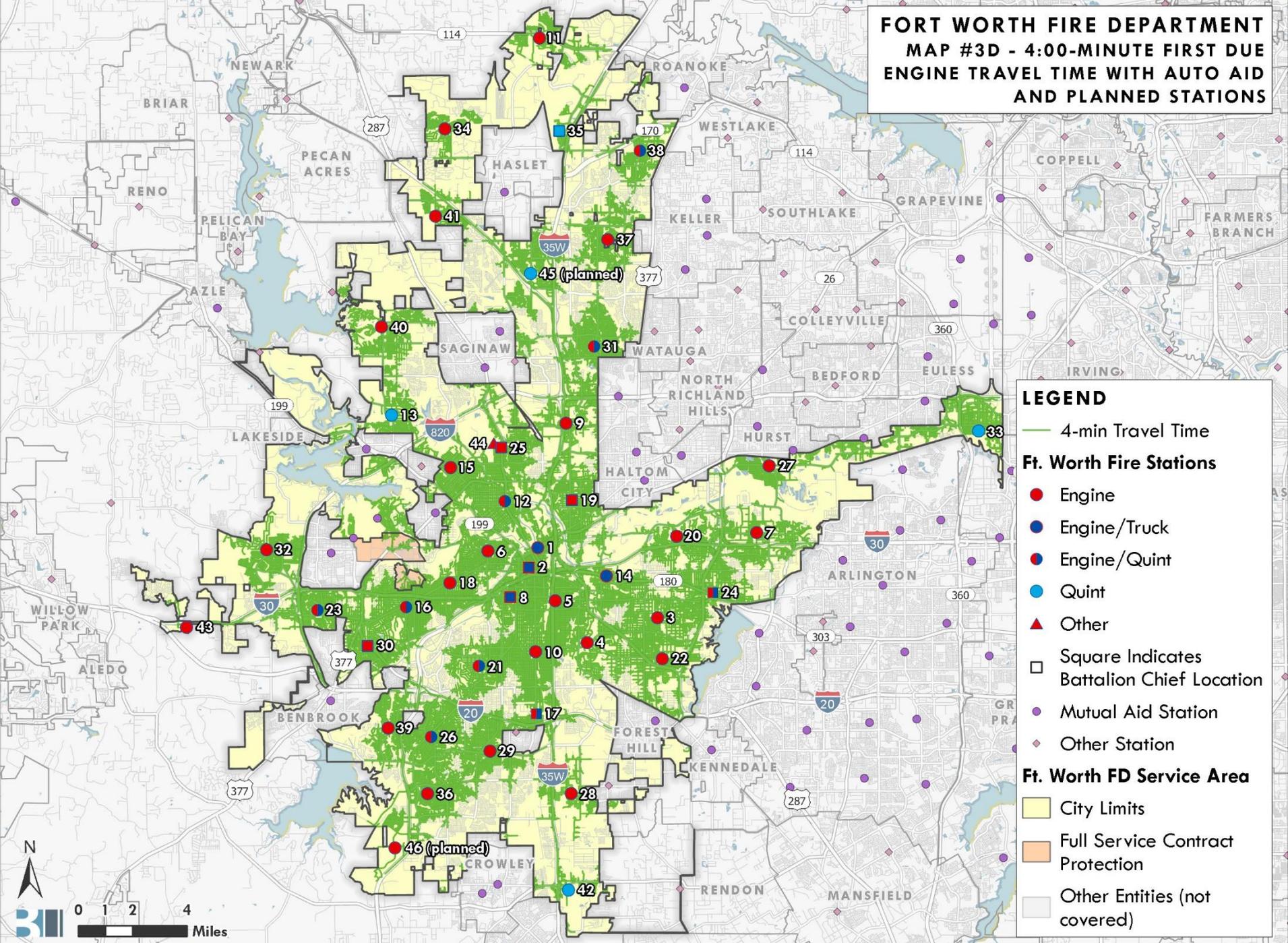
Ft. Worth Fire Stations

- Engine
- Engine/Truck
- Engine/Quint
- Quint
- ▲ Other
- Square Indicates Battalion Chief Location
- ◆ Mutual Aid Station
- ◆ Other Station

Ft. Worth FD Service Area

- City Limits
- Full Service Contract Protection
- Other Entities (not covered)

**FORT WORTH FIRE DEPARTMENT
MAP #3D - 4:00-MINUTE FIRST DUE
ENGINE TRAVEL TIME WITH AUTO AID
AND PLANNED STATIONS**

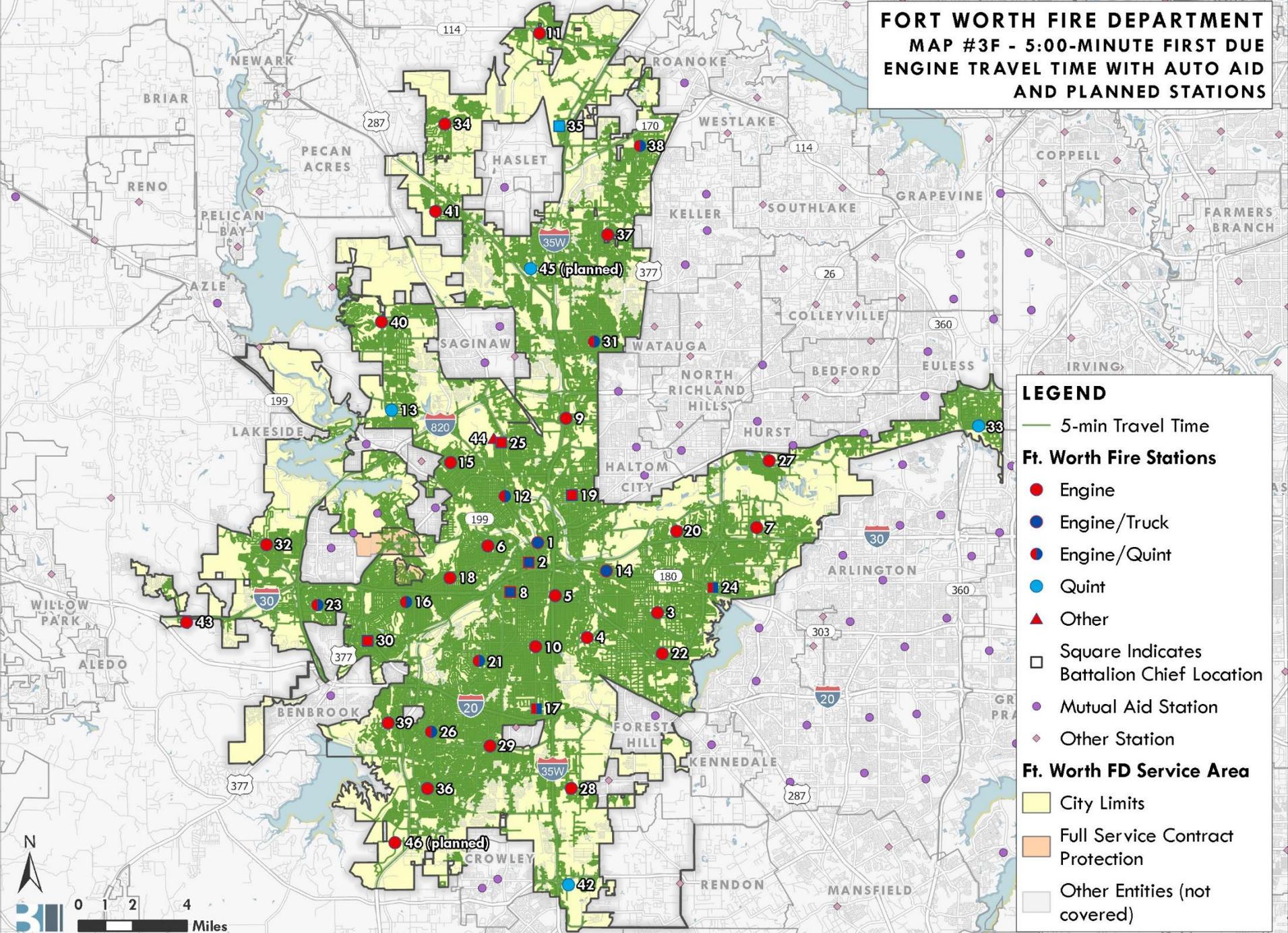


LEGEND

- 4-min Travel Time
- Ft. Worth Fire Stations**
- Engine
- Engine/Truck
- Engine/Quint
- Quint
- ▲ Other
- Square Indicates Battalion Chief Location
- Mutual Aid Station
- ◆ Other Station
- Ft. Worth FD Service Area**
- City Limits
- Full Service Contract Protection
- Other Entities (not covered)



**FORT WORTH FIRE DEPARTMENT
MAP #3F - 5:00-MINUTE FIRST DUE
ENGINE TRAVEL TIME WITH AUTO AID
AND PLANNED STATIONS**

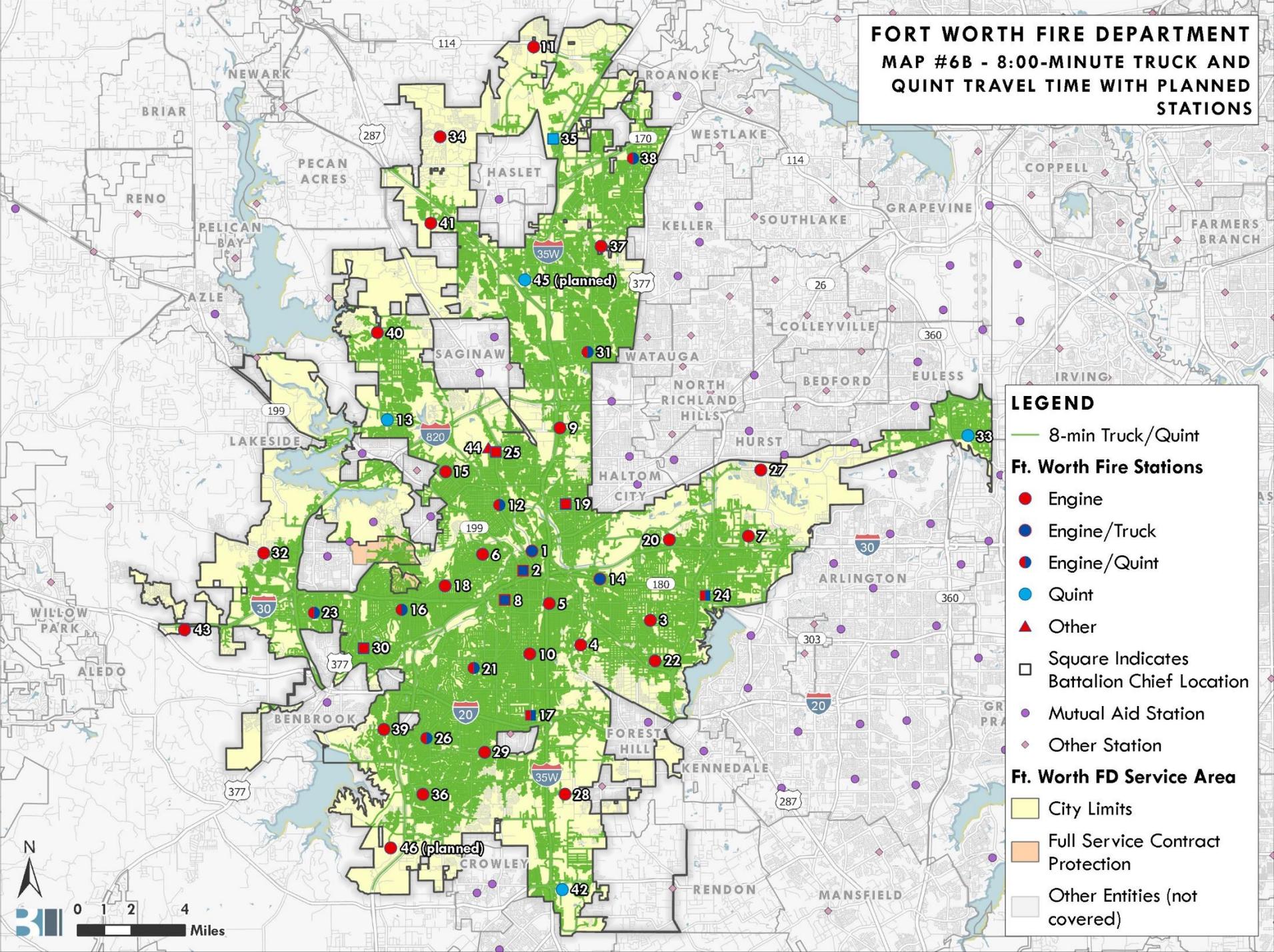


LEGEND

- 5-min Travel Time
- Ft. Worth Fire Stations**
- Engine
- Engine/Truck
- Engine/Quint
- Quint
- ▲ Other
- Square Indicates Battalion Chief Location
- Mutual Aid Station
- ◆ Other Station
- Ft. Worth FD Service Area**
- City Limits
- Full Service Contract Protection
- Other Entities (not covered)



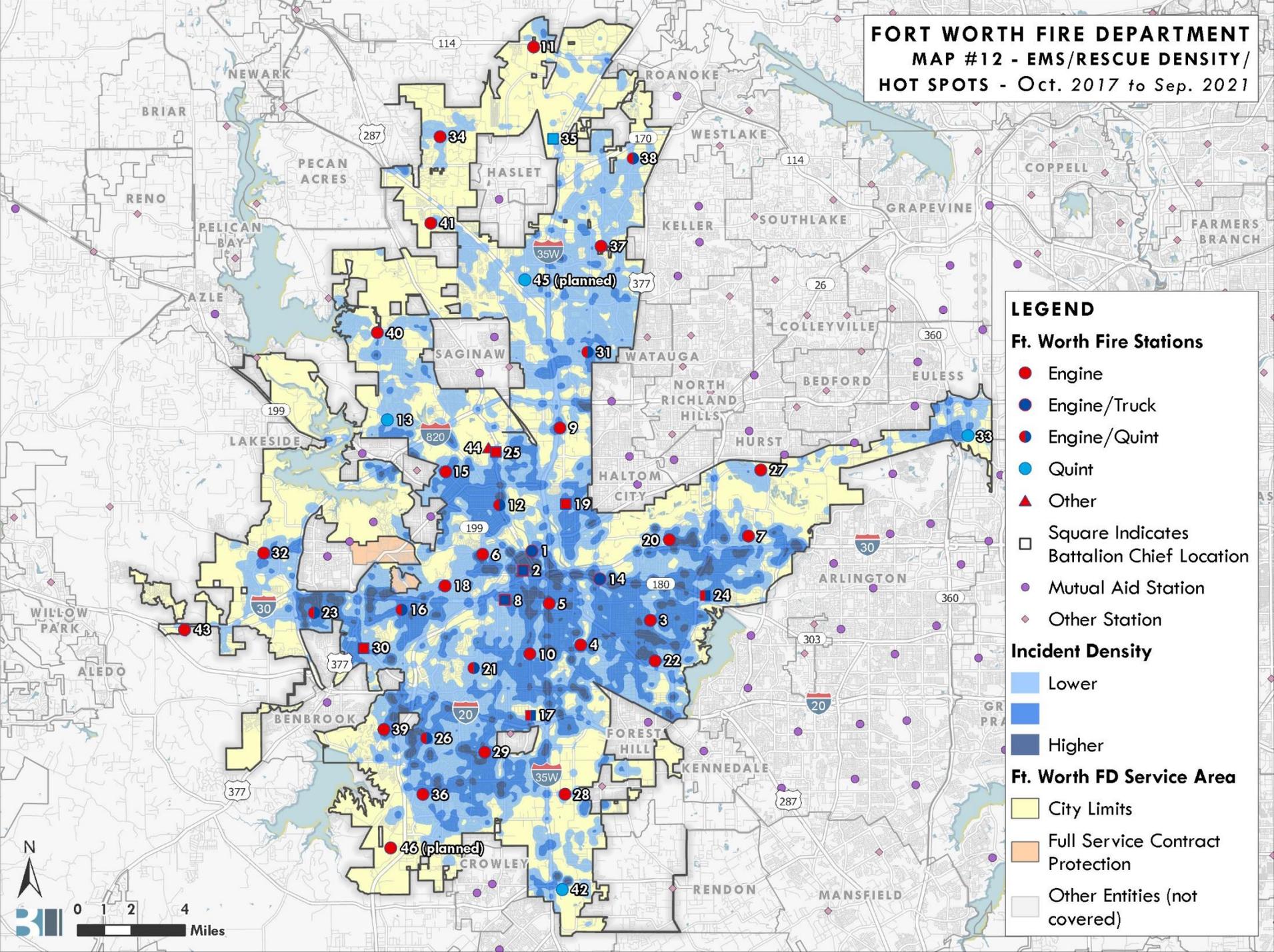
**FORT WORTH FIRE DEPARTMENT
MAP #6B - 8:00-MINUTE TRUCK AND
QUINT TRAVEL TIME WITH PLANNED
STATIONS**



LEGEND

- 8-min Truck/Quint
- Ft. Worth Fire Stations**
- Engine
- Engine/Truck
- Engine/Quint
- Quint
- ▲ Other
- Square Indicates Battalion Chief Location
- ◆ Mutual Aid Station
- ◆ Other Station
- Ft. Worth FD Service Area**
- City Limits
- Full Service Contract Protection
- Other Entities (not covered)

**FORT WORTH FIRE DEPARTMENT
MAP #12 - EMS/RESCUE DENSITY/
HOT SPOTS - Oct. 2017 to Sep. 2021**



LEGEND

Ft. Worth Fire Stations

- Engine
- Engine/Truck
- Engine/Quint
- Quint
- ▲ Other
- Square Indicates Battalion Chief Location
- Mutual Aid Station
- ◆ Other Station

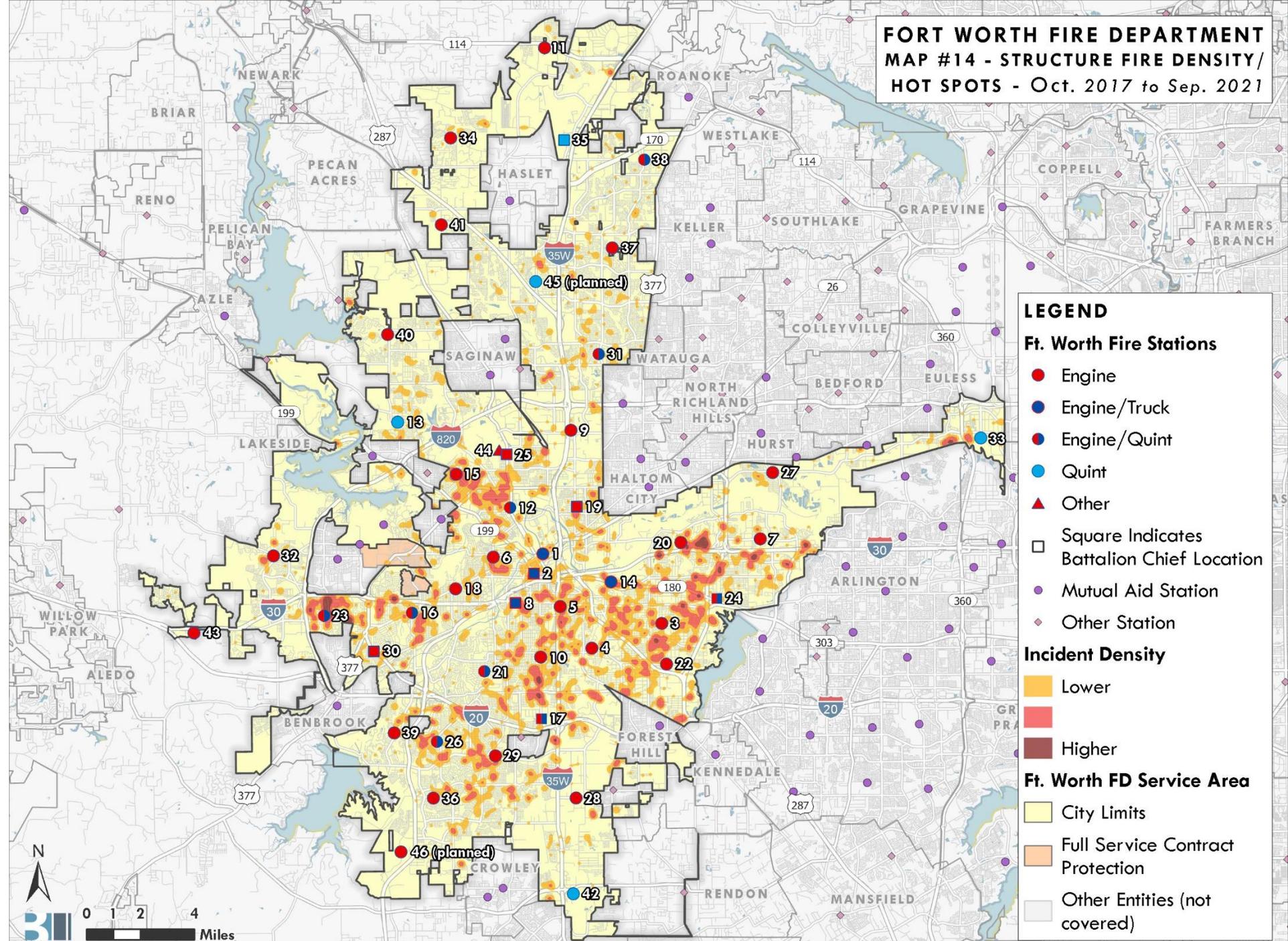
Incident Density

- Light Blue Lower
- Dark Blue Higher

Ft. Worth FD Service Area

- Yellow City Limits
- Orange Full Service Contract Protection
- Grey Other Entities (not covered)

**FORT WORTH FIRE DEPARTMENT
MAP #14 - STRUCTURE FIRE DENSITY/
HOT SPOTS - Oct. 2017 to Sep. 2021**



LEGEND

Ft. Worth Fire Stations

- Engine
- Engine/Truck
- Engine/Quint
- Quint
- ▲ Other
- Square Indicates Battalion Chief Location
- Mutual Aid Station
- ◆ Other Station

Incident Density

- Lower
- Higher

Ft. Worth FD Service Area

- City Limits
- Full Service Contract Protection
- Other Entities (not covered)



Staffing Per Fire Crew

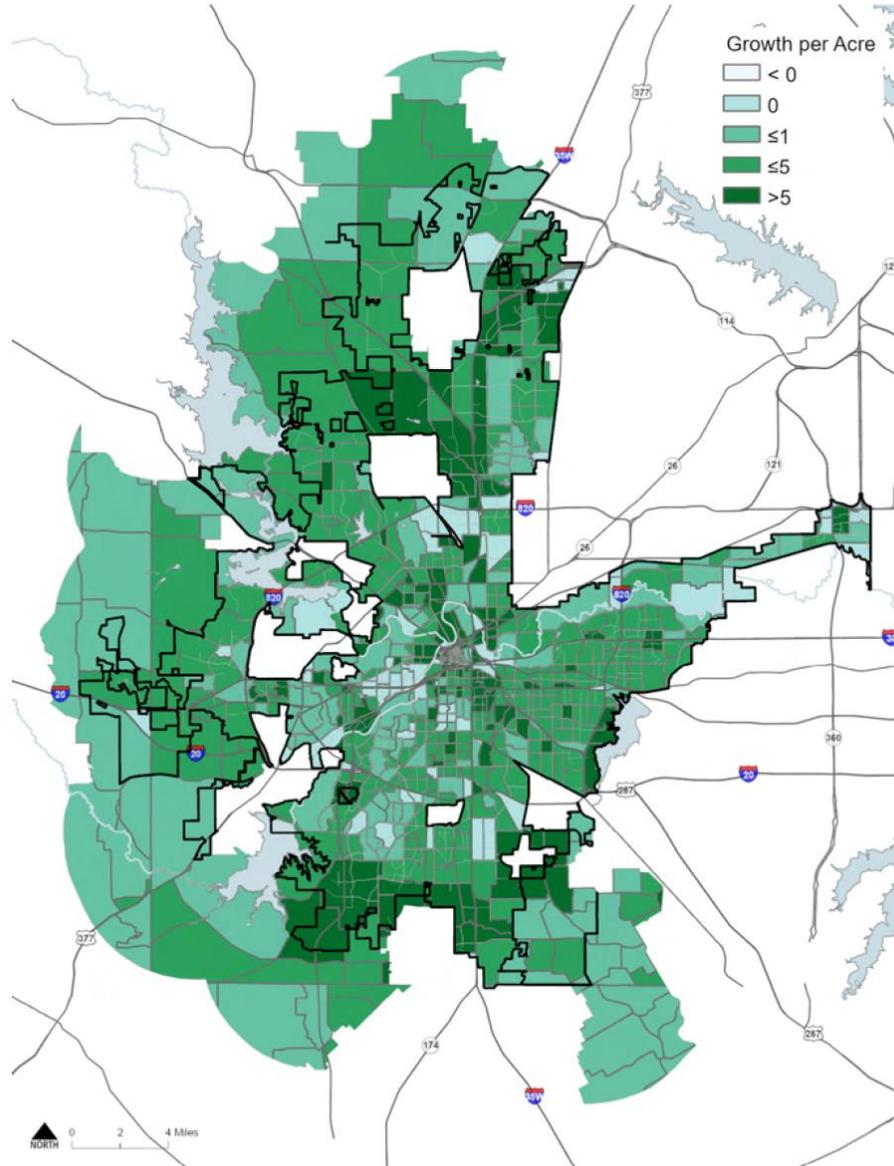
- Some units that are outside the Loop are busy and have weak second-unit times for OSHA two-in/two-out safety standard for firefighting
- The largest hazard buildings and the highest quantity of structure fires are mostly inside the Loop where there is better coverage
- The current system depends on both the speed and weight of the attack to deliver enough staffing to be effective
- For the risks to be protected and the large station areas, the City should continue the practice of staffing primary fire engines and quints/ladders with four firefighters per crew 24/7/365

Growth Projections

- The 2021 population was 930,702; 13th largest city in the U.S.
- 25% population growth since 2010
- The population is projected to reach more than 1.2 million people by 2045, a growth of 31% from 2020
- Faster residential growth outside the Loop and at the margins
- Industrial growth areas are outside the Loop and in the far northeast
- The bulk of growth is where station spacing is the weakest

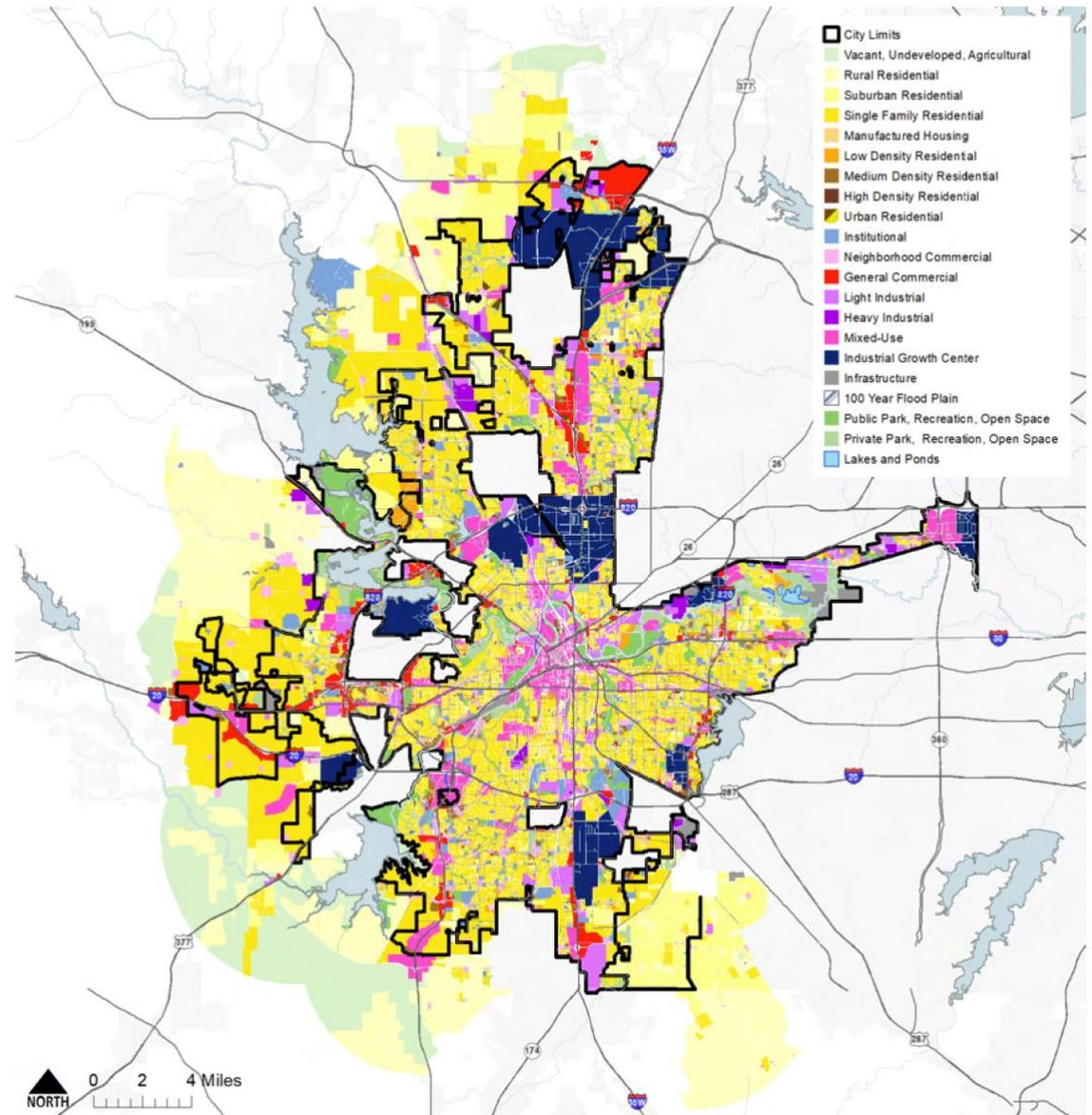
Sources: CFW 2021 Comprehensive Plan, Section 1-1; Council Memo 5/31/22

PROJECTED POPULATION GROWTH, 2010 - 2045



Source: North Central Texas Council of Government Demographic Forecast, 2015.

FUTURE LAND USE



Deployment Summary

Deployment Recommendations

Recommendations

- **Adopt City Council policy** response-time goals linked to risks and desired outcomes
- **Improve** dispatch and turnout times *significantly*:
 - *First, with the current system*
 - *Second, merge the centers with different workflows and tasks by position*
- **Foster low-acuity EMS** response systems with MedStar, beginning with the redefinition of a Priority 1 incident
- **Measure** all aspects of performance using 90% standard against adopted policies and report progress quarterly to the community

Improved Response Time Goal

Agency	RY 20/21 Fire and MedStar Received to First Arrival	Plus Police 9-1-1 Transfer Processing 3 Year 90%	Total
Fire	10:21	2:42	13:03
Fire saves 1:00 minute turnout time + Police transfer drops to 30 seconds	9:21	0:30	9:51
MedStar	14:16	2:42	16:58
MedStar with Police to 30 seconds	14:16	0:30	14:46

Staffing and Deployment Measures

- Due to workloads, risks, and large station areas, **maintain four-firefighter staffing *in the as-is system***
- Open new Station 45 with **an engine company, a quint, and a Battalion Chief**
- **Proceed as planned** with Station 46—land has been acquired
- Keep unit-hour utilizations **at or below 30%**
 - To accomplish this, continue to have MedStar handle low-acuity incidents
 - If 30% is exceeded hour over hour on some units, relief can occur with the use of two-firefighter squads for EMS and non-fire / EMS-assist incidents

Add Fire Station Recommended Trigger Point

- Adopt trigger thresholds for opening a station
- Suggested maximums:
 - There are more than 10,000 residents in a contiguous area beyond a five-minute *travel* time from a station
 - In commercial-only areas, there are more than 5,000 employees (or others) in a contiguous area beyond an eight-minute *travel* time from a station

Improve Paramedic Delivery

- **Increase MedStar paramedic ambulance coverage** to 90% of Priority 1 incidents at 9:50 minutes from the time of 9-1-1 answer at the Police Department, and/or
- Task the Fire Department to **implement paramedic engine first responders** with 20–25 existing resources in the most difficult to reach neighborhoods, and then identify the time and costs required to expand the program to all City fire stations
- If City general funds are needed to increase MedStar ambulance coverage, identify the **governance changes** so City Council can control the use of general revenues

Fire Headquarters Staffing and Support Program Challenges

Budget and Overtime Review Summary Points

- The Department **consistently underbudgeted overtime** using small-percentage, year-over-year increases instead of modeling the actual drivers of overtime
- Underbudgeting of overtime and the use of “**reassigned positions**” for headquarters staffing was obscured by vacant position savings
- COVID-19 **altered workers’ compensation usage patterns**
- Hiring filled vacancies, lowering savings to offset overtime

Reassigned (Loaned) Positions in Headquarters

- **19 business sections** organized into four bureaus for the necessary business, technical, and logistics services required
- The services and programs provided are all appropriate
- Headquarters programs are not overstaffed
- Over many years, **at times up to 60 personnel were administratively reassigned (loaned) from fire station operations to headquarters to provide needed capacity**; as of March 2022, these positions represented 29% of headquarters staff
- The reassigned positions are all serving valuable functions—they need deeper study for permanence, or policy choices as to services and programs to be reduced or stopped

Ongoing Headquarters Staffing Growth

- Add positions **to keep services at pace with the growth** of the Department and City
- Consider **converting some positions to non-sworn over time**
- The following table identifies Citygate's top priority for "reassigned" positions review
- City and Department staff **must refine these identified positions** and, where needed, bring programs for reduction or expansion to the Council for policy consideration

Headquarters Staffing Counts

Bureau/Office	Priority 1 Important to Maintain Regulatory and Needed Services at Current Levels
Loaned Positions	38
Fire Chief's Office	0
Fire Administration Services Bureau	0
Fire Operations Bureau	0
Executive Services Bureau	11
Support Services, Logistics, and Communications Bureau	27

Headquarters Summary Recommendations

- **Build a robust, multifaceted overtime request model** that can deliver budget requests far more accurately and transparently
- Fire business services must separate some fiscal duties and increase staffing to **reduce single-point failure risks**
- **Equip all reserve fire apparatus** for use without needing to transfer equipment from front-line units under repair or from the warehouse
- The Department's fleet and information technology staffs can **better integrate and make use of centralized City services**

Capstone Recommendations and Priorities

Stabilize – Become Data-Driven – Improve

- Set policies to deliver the outcomes desired, in consideration of public and firefighter safety
- **Streamline dispatch now—*time is everything***
- Refine how to to continue effective headquarters programs
 - Field services must be supported via effective training, logistics, and quality of care oversight
 - Stability in headquarters programs comes before growth of new or expanded services and programs

Once Stability is Attained

- As growth occurs, maintain a baseline of **equitable, neighborhood-based fire and paramedic care**
- Establish **patient-centric, customer quality of care triggers** for right-sized headquarters services *as the City grows*
- Consider the use of **non-sworn FTEs in headquarters**

Next Steps

Next Steps – Near-Term

- Adopt a set of **updated response time policies**
- Direct staff to **significantly lower dispatch-processing time**
- Improve **first paramedic response times to all neighborhoods** by directing the deployment of the already available firefighter paramedics
- Open Fire Station 45 with an **additional engine, quint, and Battalion Chief** as soon as the staff can be hired and promoted
- Resolve how to **fund and maintain appropriate headquarters services**
- Determine the **best organizational location for Emergency Management**; move to City Manager's Office

Next Steps – Longer-Term

- **Establish a Fire, Planning and Data Analytics, and Development Services team** to model ongoing growth against the City Council's deployment goals for added fire stations and units
- Adopt a Council policy that **identifies a trigger point for adding fire stations** coinciding with population growth and new neighborhoods

Questions and Discussion